

CLAIMS

What is claimed is:

1. A method to perform a low latency inter-technology handoff of a mobile node (MN) from a wireless local area network (WLAN) to a cellular network, comprising:

transmitting a Bearer Context message from the MN for use by the cellular network, the Bearer Context message comprising information for use in establishing at least one access bearer with the cellular network for an ongoing packet data session of the MN; and

responding to the receipt of the Bearer Context message with a Router Advertisement message that is forwarded towards the MN.

2. A method as in claim 1, where the Bearer Context message is piggybacked on another message.

3. A method as in claim 1, where the Bearer Context message comprises information expressive of a QoS requirement of an ongoing application or applications of the MN.

4. A method as in claim 1, where the Bearer Context message comprises information expressive of a unique identity of the MN that is recognizable by the cellular network.

5. A method as in claim 1, where the Bearer Context message comprises information expressive of parameters to facilitate the creation of a Point-to-Point Protocol state in the cellular network.

6. A method as in claim 1, where the Bearer Context message comprises information expressive of parameters to enable establishment of packet filters in the cellular network.

7. A method as in claim 1, where the Bearer Context message is piggybacked on a Router Solicitation message that is sent from an access router (AR) in response to receiving a Proxy Solicitation Request message from the MN.

8. A method as in claim 7, where the Router Advertisement is sent to the AR, which in response sends a Proxy Router Advertisement to the MN.

9. A method as in claim 8, where the Router Advertisement comprises a challenge for authentication and authorization purposes.

10. A method as in claim 8, where the MN responds to the Proxy Router Advertisement by sending a Registration Request message to the cellular network.

11. A method as in claim 10, where the Proxy Router Advertisement comprises a challenge for authentication and authorization purposes, and where the Registration Request message comprises information for identifying a home Authentication, Authorization, Accounting (AAA) function of the MN in the cellular network, and a response to the challenge received in the Proxy Router Advertisement.

12. A method as in 11, where, in response to receiving the Registration Request message, a query is sent to the home AAA of the MN.

13. A method as in claim 12, where the query is sent via a visited AAA either directly or via at least one intermediate broker AAA.

14. A method as in claim 12, where the query sent to the home AAA comprises information that indicates the challenge sent to the MN, and the response to the challenge received from the MN, for use by the home AAA in authenticating the MN.

15. A method as in claim 14, where the query sent to the home AAA comprises information that indicates the access service requested by the MN.

16. A method as in claim 14, further comprising, in response to successfully authenticating the MN, sending a success indication from the home AAA for authorizing access by the MN.

17. A method as in claim 16, where the success indication further comprises a ticket sent in clear text and in a form encrypted using a shared secret between the home AAA and the MN.

18. A method as in claim 17, where the clear text form of the ticket is stored in a cellular network node and where the encrypted ticket is sent to the MN via the AR.

19. A method as in claim 18, further comprising sending an acknowledgment (ACK) from the MN to the cellular network, the ACK comprising the clear text ticket.

20. A method as in claim 19, in response to receiving the clear text ticket from the MN, further comprising performing access bearer setup in the cellular network for establishing at least one access bearer for the MN.

21. A method as in claim 20, further in response to receiving the clear text ticket from the MN, registering the MN with the HA and, upon receiving a Registration Reply from the HA, forwarding the Registration Reply from the cellular network to the MN upon an established access bearer.

22. A method as in claim 17, further comprising generating a session key at the home AAA as clear text and in an encrypted form, using the shared secret between the MN and the home AAA, storing the clear text session key in a cellular network node, and forwarding the encrypted form of the session key to the MN for use by the MN in at least one of authenticating and encrypting future message transactions with the cellular network.

23. A method as in claim 1, where the Bearer Context is sent by the MN in an encrypted form using a shared secret between the MN and a home Authentication, Authorization, Accounting (AAA) function of the MN in the cellular network.

24. A method as in claim 1, where communication between the MN and the cellular network comprises a HI/HACK (Handover Initiate/Handover ACK) message exchange, and where the Bearer Context message is piggybacked on the HI message.

25. A method as in claim 24, where the cellular network responds to a receipt of the Bearer Context message with a Mobile Node-Foreign Agent (MN-FA) challenge extension that is piggybacked on the HACK message

26. A method as in claim 1, where the MN transmits the Bearer Context message in response to a change in at least one of WLAN-related signal strength, signal quality and other information, such as geographical coverage information.

27. A data communications system comprising a mobile node (MN), a wireless local area network (WLAN) and a cellular network, further comprising:

a transmitter for transmitting a Bearer Context message from the MN to the cellular network, the Bearer Context message comprising information for use in establishing access bearers in the cellular network for an ongoing packet data session of the MN; and

responding to the receipt of the Bearer Context message with a Router Advertisement message that is forwarded towards the MN.

28. A system as in claim 27, where the Bearer Context message is piggybacked on another message.

29. A system as in claim 28, where the Bearer Context message is piggybacked on a Router Solicitation message that is sent from an access router (AR) in response to receiving a Proxy Solicitation Request message from the MN.

30. A system as in claim 28, where communication between the MN and the cellular network comprises a HI/HACK (Handover Initiate/Handover ACK) message exchange, where the Bearer Context message is piggybacked on a HI message, and where the cellular network responds to a receipt of the Bearer Context message with a Mobile Node-Foreign Agent (MN-FA) challenge extension that is piggybacked on a HACK message

31. A system as in claim 27, where the Bearer Context message comprises information expressive of at least one of a QoS requirement of at least one ongoing application of the MN, a

unique identity of the MN that is recognizable by the cellular network, parameters to facilitate the creation of a Point-to-Point Protocol state in the cellular network, and parameters to enable establishment of packet filters in the cellular network.

32. A system as in claim 27, where the Bearer Context message is received by a Packet Data Support Node (PDSN).

33. A computer program for controlling operation of a mobile node (MN) that is operable with either a wireless local area network (WLAN) or a cellular network, said computer program being responsive to a change in at least one of received WLAN signal strength and signal quality for transmitting a Bearer Context message from the MN to the cellular network, the Bearer Context message comprising information for use in establishing at least one access bearer in the cellular network for an ongoing packet data session of the MN.

34. A computer program as in claim 33, where the Bearer Context message is piggybacked on another message.

35. A computer program as in claim 34, where the Bearer Context message is piggybacked on a Router Solicitation message that is sent from an access router (AR) in response to receiving a Proxy Solicitation Request message from the MN.

36. A computer program as in claim 34, where communication between the MN and the cellular network comprises a HI/HACK (Handover Initiate/Handover ACK) message exchange, where the Bearer Context message is piggybacked on a HI message, and where the cellular network responds to a receipt of the Bearer Context message with a Mobile Node-Foreign Agent (MN-FA) challenge extension that is piggybacked on a HACK message

37. A computer program as in claim 33, where the Bearer Context message comprises information expressive of at least one of a QoS requirement of at least one ongoing application of the MN, a unique identity of the MN that is recognizable by the cellular network, parameters to facilitate the creation of a Point-to-Point Protocol state in the cellular network, and parameters to enable establishment of packet filters in the cellular network.

38. A computer program for controlling operation of a network node of a cellular network, said computer program being responsive to a receipt of a Bearer Context message from a mobile node (MN) that is currently wirelessly coupled to a wireless local area network (WLAN) for initiating the establishment of a cellular network access bearer for the MN, the Bearer Context message comprising information for use in establishing the at least one access bearer in the cellular network for an ongoing packet data session of the MN.

39. A computer program as in claim 38, where the cellular network node comprises a packet data support node (PDSN).

40. A computer program as in claim 39, where the cellular network comprises a cdma2000 cellular network.

41. A computer program as in claim 38, where said cellular network node responds to the receipt of the Context Bearer message by sending a Router Advertisement message that comprises a Mobile Node-Foreign Agent challenge extension message towards the MN.